

## SECTION 15641

### INDUCED DRAFT COOLING TOWERS – STEEL

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#### **LANL MASTER CONSTRUCTION SPECIFICATION**

When editing to suit project, author shall add job-specific requirements and delete only those portions that in no way apply to the activity (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the ESM Mechanical POC.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General Requirements.

Delete information within “stars” during editing.

Specification developed for ML-3 / ML-4 projects. For ML-1 / ML-2, additional requirements and QA reviews are required.

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#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Factory fabricated induced draft cooling towers – steel.

##### 1.2 PERFORMANCE REQUIREMENTS

- A. Tower to operate at 7500 feet elevation.

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Comply with the LANL Engineering Manual, Structural Chapter, for site-specific seismic criteria.

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- B. Tower assembly to comply with the requirements of UBC seismic zone [2B] [4] construction.
- C. Do not exceed the following sound pressure levels, measured at grade level 50 feet from cooling tower:
  - 1. Hz/dB: 63/75, 125/72, 250/75, 500/71, 1000/60, 2000/60, 4000/49, 8000/40.
  - 2. Weighted average: 73dBA.

##### 1.3 SUBMITTALS

- A. Submit the following in accordance with Section 01330, Submittal Procedures:
  - 1. Catalog data.
  - 2. Certifications that cooling tower performance, based on CTI 201, meets or exceeds specified requirements.
  - 3. Installation instructions.

4. Performance curves for site-specific data, plotting entering water temperature and leaving water temperature against wet bulb temperature.
5. Operations and maintenance data.
6. Warranties.
7. Shop drawings.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the product specified in this section with minimum 5 years experience. Manufacturer must be a member of the Cooling Tower Institute.
- B. Materials:
  1. Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84.
  2. 100 percent asbestos free.

#### 1.5 WARRANTY

- A. Warrant the entire tower, including the motor, against failure due to defects in materials and workmanship for a period of 5 years following shipment to the site.

### PART 2 PRODUCTS

#### 2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Alternate products may be accepted; follow Section 01630, Product Options and Substitutions.

#### 2.2 MANUFACTURER

- A. Marley Cooling Tower Co., Model NC [                      ].

#### 2.3 PERFORMANCE

- A. Capacity:
  1. Btu/h: [                      ].
  2. Water Flow: [                      ] gpm.
  3. Tower Water Supply Temperature: [75] degrees F.
  4. Tower Water Return Temperature: [85] degrees F.

5. Entering Design Air WB Temperature: [65] degrees F.

## 2.4 PHYSICAL DATA

- A. Dry Weight: [ ] pounds.
- B. Operating Weight: [ ] pounds.
- C. Overall Dimensions: [ ] long, [ ] wide, [ ] high.

## 2.5 MANUFACTURED UNIT

- A. Provide unit for outdoor use, factory assembled, single cell, cross flow, vertical discharge, induced draft type, with motor.
- B. Cooling Tower Construction: Heavy gauge galvanized steel structural components, cold-water basin, basin covers, hot water basin, fan deck and fan cylinder. Components subject to factory welding shall be hot dipped galvanized after completion of fabrication.

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Motor selection is based on tower operation, e.g., tower operating during winter season. Consult with tower manufacturer for motor selection. Size per ESM Mechanical Chapter D30GEN, Motors

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- C. Motor: Mounted outside of air stream [2 speed, 1800/900 rpm] [single speed, 1800 rpm] [constant speed, 1800 rpm with VFD] totally enclosed fan cooled (TEFC). Comply with Section 15170, Motors.
  - 1. [ ] hp.
  - 2. [ ] volts, 3 phase, 60 Hz.
- D. Fan: Multi-blade, cast aluminum, manual adjustable pitch.
  - 1. Fan Diameter: [ ] inches.
  - 2. Air Flow: [ ] cfm.
- E. Fan Drive: Right angle, industrial duty, oil lubricated, geared speed reducer equipped with an oil level sightglass and drive shaft. Speed reducers employing sheaves and belts are not acceptable.
- F. Fan Guard: One piece welded steel rod and wire guard, hot dipped galvanized after fabrication.
- G. Fill, Louvers, Drift Eliminators: 15 mil (0.015 inch) thick PVC fill sheet. Drift not to exceed 0.005 percent of circulated design gpm.
- H. Hot Water Distribution System: Provide basin covers and orifice type inert polypropylene nozzles that are easily removable and replaceable. Provide flow-control valves at inlet to each basin to permit flow balancing and maintenance shut-off to selected cells. Provide top dual inlet connections per cell.

- I. Cold Water Basin: Basin with water level controller, integral sump with openings for supply, return (with strainer), overflow, make-up water, and drain. Provide [Bottom] [Bottom depressed] [Side] outlet connection.
- J. Accessories:
  - 1. Electric Immersion Heaters: In cold water basin, suitable to maintain basin water temperature at 42 degrees F when outside temperature is minus 10 degrees F. Basin heater [ ] kW, [ ] volts, [ ] phase, 60 Hz.
  - 2. Safety fan deck railings conforming to OSHA standards.
  - 3. Ladder from [grade] [roof] to fan deck conforming to OSHA standards.
  - 4. Vibration Limit Switch: To break power circuit to fan motor in a situation of excess vibration, factory wired, manual re-set and field adjustable for sensitivity. Provide easy access to switch.
  - 5. Water Level Controller: Flygt Multi-trode (MTR) level sensor, control relay (120 volts) and interconnecting cable shall be furnished and installed by the tower manufacturer. The relay shall provide a control voltage for a solenoid valve to fill the basin (high/low sensor) and contacts for a high level alarm. This unit replaces the float valve in the cold-water basin.
  - 6. Variable Frequency Drive (VFD):

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Consult with project electrical engineer and refer to the LANL electrical standards for VFD requirements.

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## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Connect tower water supply and return piping to tower. Pitch tower water supply piping to tower and water return piping away from tower.
- B. Connect make-up piping with isolation valve connection to tower. Pitch piping to tower.
- C. Connect overflow and drain piping to tower and route to floor drain. Provide an isolation valve in drain line.

### 3.2 CONTRACTOR'S FIELD SERVICES

- A. Fill system with water. Notify LANL Construction Inspector immediately in the event of an accidental spill.
- B. Check and fill gear drive with oil as recommended by manufacturer.
- C. Rotate fan assembly and gear drive weekly from time of arrival to start-up.
- D. Verify operation of water temperature controls.

### 3.3 MANUFACTURER'S FIELD SERVICES

- A. Check, test, and start-up tower in presence of LANLs operating personnel.
- B. Instruct LANLs operating personnel in operating and routine maintenance procedure.  
Schedule a minimum of 4 hours training during normal working hours.

END OF SECTION

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Do not delete the following reference information:  
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FOR LANL USE ONLY

This project specification is based on LANL Master Construction Specification Rev. 3, dated September 29, 2004.